

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/784,090
Filing Date: February 20, 2004
Applicants: Henry W. Bonk et al.
Group Art Unit: 1772
Examiner: Walter B. Aughenbaugh
Title: GAS-FILLED CUSHIONING DEVICE
Docket No.: 4022-00003DVC

Director of the United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Amended Appeal Brief Under 37 C.F.R. § 41.37

Sir:

This Amended Appeal Brief is filed in response to the Notification of Non-Compliant Appeal Brief mailed November 16, 2007. This Amended Appeal Brief is being submitted within the one-month or thirty-day period for reply.

Appellants respectfully argue that the Amended Appeal Brief filed 15 August 2007 was compliant in form with the requirements under section 41.37, and thus it was improper for the Examiner to mail a Notification of Non-Compliant Appeal Brief; the brief was already compliant. The Examiner contended that the *substance* of the concise explanation of the subject matter defined in each independent claim (which he acknowledged by his discussion was present) was incorrect, or, rather, unclear. If so,

such matters should be taken up in the Examiner's Answer. (Clarity is not a requirement under the rule. And, as the Examiner's first sentence on the continuation sheet demonstrates, clarity is not a requirement for papers coming out of the USPTO, either.)

However, solely in an effort to further prosecution, and to avoid any possibility that the Board might find Appellants' Summary of the Claimed Subject Matter as difficult to understand as the Examiner claims to, Appellants have amended the section of the Summary of Claimed Subject Matter, incorporating more description of Figures 3-5 from the specification. The Examiner appears to have not appreciated what is shown in Figure 3; perhaps the added material will clarify.

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Real Party in Interest

The real party in interest is Nike International, Ltd., a Bermuda corporation having a place of business in Beaverton, Oregon to which the inventors have assigned all rights to the invention. The assignment was recorded in the United States Patent and Trademark Office at Reel 7718, Frames 0238 and 0054.

Related Appeals and Interferences

An appeal was filed in a parent application to this application, Patent Application No. 09/170,790, now U.S. Patent No. 6,599,597. The claims of Patent Application No. 09/170,790 had been finally rejected over the same patent, Moureaux, U.S. Patent No. 5,036,110. The Board of Appeals and Interferences found that claims in which the barrier membranes contained 50 weight percent or less thermoplastic urethane in the first layer. This decision is included in the Related Proceedings Appendix.

Status of the Claims

Claims 1-10 are pending in the application and stand finally rejected. This appeal is taken as to all of the pending claims.

Status of Amendments

No amendment was filed after the final rejection.

Summary of Claimed Subject Matter

The appealed claims include one independent claim, claim 1, and dependent claims 2-10. Independent claim 1 is directed to a gas-filled cushioning device comprising a multi-layer film formed into a gas-filled membrane having an interior compartment containing at least one capture gas constituent. Page 16, lines 1-6; page 20, lines 2-4; page 22, lines 6-7; page 35, lines 1-3; and Figures 3-5 showing multi-layer films formed into membranes 28 provided in the form of a cushioning device and shown situated in a shoe in Figures 1 and 2 (see also page 36, lines 8-18), and Figures 12-16 illustrating cushioning devices 28D and 28E inflated and inflation port 38 sealed by RF welding. Figure 3 is a section view taken along line 3—3 of Figure 1. Page 18, line 7. Thus, Figure 3 shows the multi-layer film 28 as used in a shoe, in tubular cross-section, embedded in mid sole 26 of sole 14, the sole 14 being adjacent upper 12. Page 20, lines 2-19. As used in a shoe, the tubular films are sealed to contain an injected captive gas. Page 20, lines 18-20.

The diffusion properties of the membrane 28 are provided by an inner barrier layer 30 which is disposed along the inner surface of a thermoplastic outer layer 32; these two membrane layers are best seen in Figures 4 and 5. Page 20, line 21 to page 21, line 2. (The membrane can be formed in a variety of configurations and shapes some of which are shown in the Figures, and which may be tube, ped, or other configuration. Page 21, line 2 to page 22, line 5.) Figure 4 is a fragmentary side perspective view of a tubular-shaped, two-layer cushioning device in accordance with the present invention, while claim 5 is a sectional view taken along line 4—4 of Figure 4. Page 18, lines 8-10. The multi-layer film includes a first layer 30 comprising a combination of at least one aliphatic thermoplastic polyurethane and at least one copolymer of ethylene and vinyl alcohol, wherein the first layer includes up to about 50 weight

percent of an aliphatic thermoplastic polyurethane, and a second, outer layer 32 comprising a flexible resilient elastomeric thermoplastic material. Page 22, lines 6-13; page 23, lines 8-11; page 28, lines 13-16, Figures 4, 5, 7. The multi-layer film is capable of selectively resisting an outward diffusion of the capture gas constituent and permitting inward diffusion pumping of at least one mobile gas constituent. Page 16, lines 1-21. Hydrogen bonding occurs along a segment of the film between the first layer and the second layer. Page 31, line 20 to page 34, line 1.

Claims 2 and 6 are separately patentable as claiming a gas-filled cushioning device as in claim 1 in which the first layer includes between about 1 wt. % to about 30 wt. % of aliphatic thermoplastic polyurethane. Page 28, lines 13-16.

Claim 9 is separately patentable as claiming a gas-filled cushioning device as in claim 1 in which the first layer includes 50 wt. % to about 97 wt. % of at least one copolymer of ethylene and vinyl alcohol. Page 29, lines 16-17.

Claim 4 is separately rejected. Claim 4 claims a gas-filled cushioning device as in claim 1 in which the first layer has an average thickness of about 0.5 mils to about 10 mils and the second layer of thermoplastic material has an average thickness of about 5 mils to about 100 mils. Page 35, line 20 to page 36, line 2

Claim 7 is separately rejected. Claim 7 claims a gas-filled cushioning device as in claim 1 in which the copolymer of ethylene and vinyl alcohol is selected from the group consisting of copolymers including an ethylene content of about 25 mol. % to about 48 mol. %. Page 29, lines 2-4.

Claim 8, separately rejected, claims a gas-filled cushioning device of claim 1 in which the first layer includes an aromatic thermoplastic polyurethane. Page 29, lines 11-13.

Grounds of Rejection to Be Reviewed on Appeal

Claim 1 stands rejected for obviousness-type double patenting over claim 1 of Bonk et al., U.S. Patent No. 6,599,597 in view of Moureaux, U.S. Patent 5,036,110.

Claims 1-3, 5, 6, 9, and 10 stand rejected under 35 U.S.C. § 102(b) as anticipated by Moureaux, U.S. Patent 5,036,110.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Moureaux, U.S. Patent 5,036,110.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Moureaux, U.S. Patent 5,036,110 in view of Matsumoto et al., U.S. Patent 4,410,595.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Moureaux, U.S. Patent 5,036,110 in view of Smith et al., U.S. Patent 5,450,235.

Argument

- I. Claims 1-10 are patentable over Moureaux, U.S. Patent 5,036,110 because this Board has already held in the Decision on Appeal in parent Application No. 09/170,790 that Moureaux does not suggest a Applicant's multi-layer film in which the first layer has 50 weight percent or less thermoplastic polyurethane.**

In the Decision on Appeal in the parent application, US Patent Application No. 09/170,790, this Board held that Appellants' claims which defined the first layer as having 50 weight percent or less thermoplastic urethane were patentable over Moureaux, US 5,036,110 and the claims in which the barrier membranes included 50-97 weight percent of the ethylene-vinyl alcohol copolymer. The claims in previous Application number 09/170,790 were directed to barrier membranes comprising first and second layers as in the present claims. The barrier membranes were sealed and inflated. In the present claims, the gas-filled cushioning device comprises a multi-layer film defined as in US Patent Application No. 09/170,790, with a first layer comprising up to about 50 wt. % of at least one aliphatic thermoplastic polyurethane.

In the Decision, this Board found that the Moureaux patent described a film 2 containing a mixture in which "the amount of ethylene-vinyl alcohol copolymer with respect to the first material [thermoplastic polyurethane] is in the range of 5-20%. Thus, Moureaux does not render obvious those claims which require that the barrier membrane include 50 weight percent or less thermoplastic urethane or those claims which require that the first layer include 5 [sic: 50] wt. % of at least one ethylene and vinyl alcohol [copolymer]." Page 10 of the Decision.

The present claims on appeal each include the very same limitation, that "the first layer includes up to about 50 wt. % of aliphatic thermoplastic polyurethane" that this Board previously held to not be disclosed or suggested by the Moureaux patent. Therefore, the present claims are

each patentable over the Moureaux patent for the same reasons as the claims containing this limitation in Application number 09/170,790 were held to be patentable over the Moureaux patent.

Appellant respectfully request the Board to follow its previous decision and hold that Appellants' claims 1-10 are patentable over the Moureaux patent.

II. Claims 1-3, 5 6, 9, and 10 are patentable over Moureaux, U.S. Patent 5,036,110 because the Moureaux patent does not teach, disclose, or suggest a Applicant's multi-layer film in which the first layer has 50 weight percent or less thermoplastic polyurethane.

A. Claims 1-3, 5, 6, 9, and 10

Appellants understand the Moureaux reference to disclose a membrane that includes a film formed from a graft polymer that is the reaction product of a thermoplastic polyurethane with a copolymer of ethylene and vinyl alcohol, with this film being sandwiched between two layers to form a laminate. Col. 2, lines 40-43; col. 6, lines 10-16. The graft polymer is formed by mixing the thermoplastic polyurethane and the copolymer at high temperatures, col. 3, lines 54-56, such that the copolymer is covalently linked to the thermoplastic polyurethane by reaction of the isocyanate groups of the polyurethane with the hydroxyl groups of the ethylene-vinyl alcohol copolymer to form urethane linkages. Col. 4, lines 5-27.

The amount of ethylene-vinyl alcohol copolymer is 5-20%, col. 2, lines 25-29 & claim 3, and thermoplastic urethane 50-95%, col. 2, lines 36-39. The result is a film in which the graft copolymer, including the ethylene vinyl alcohol, is embedded into the body of the thermoplastic urethane. Figure 1; col. 2, line 66 through col. 3, line 2; claim 9.

The membrane is then formed by sandwiching the graft polymer layer between two layers of a material selected from thermoplastic polyurethane, block amide polyethers, flexible polyesters, or mixtures thereof. Col. 1, lines 62-65; col. 2, lines 40-43; col. 6, lines 10-17 & 45-52.

Each of the present claims is not anticipated the Moureaux reference because the Moureaux reference fails to disclose or suggest hydrogen bonding between layers of a barrier membrane. More specifically, the Moureaux reference does not teach, mention, or suggest hydrogen bonding between a copolymer of ethylene-vinyl alcohol (EVOH) of a first layer and a thermoplastic polyurethane (TPU) of a second layer. Instead, the Moureaux reference teaches a first layer in which its copolymer of ethylene and vinyl alcohol is imbedded as islets in a layer of polyurethane and thus is not in contact with the surface of any further membrane layers. Moreover, there is nothing in the Moureaux reference suggesting the desirability, or any expectation of success, in producing a multi-layer membrane having hydrogen bonding between layers as part of a cushioning device.

The Moureaux reference thus fails to disclose or suggest the hydrogen bonding required by the present claims. The Moureaux reference instead describes a membrane with one layer of a graft copolymer (that is, one in which the bonds formed are covalent) of a polyurethane and a copolymer of an ethylene and a vinyl alcohol (EVOH copolymer). The EVOH copolymer, as part of the graft copolymer, is embedded into the polyurethane. Figure 1; col. 1, lines 66-68; col. 5, lines 62 to col. 6, line 1; claim 9. Therefore, Applicants believe no hydrogen bonding could occur between the EVOH embedded in the graft polymer layer and the two outside TPU layers. In contrast, the present invention teaches that the EVOH copolymer is present at the layer surface

and that hydrogen bonding between the layer containing the EVOH copolymer and the layer containing the TPU results. Claim 1; specification, page 32, line 6 to bottom of page 33.

Nor would it be obvious to modify the Moureaux reference to make a cushioning device with a membrane in which the layers are hydrogen bonded together because Moureaux teaches away from hydrogen bonding between the layers by teaching that the EVOH is imbedded in the layer and, further, that the bonding between the EVOH and the polyurethane of its own layer is covalent, not hydrogen bonding. Thus, the Moureaux reference, if anything, teaches away from hydrogen bonding between the EVOH of one layer and the polyurethane of another layer; there is no apparent reason to discard what the Moureaux reference does teach in order to move from the Moureaux configuration to Appellants' invention. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ____ (2007)(slip opinion at 12) ("when the prior art teaches away from combining certain elements, discovery of a successful means of combining them is more likely to be nonobvious"); *id.* at ____ (slip opinion at 14) ("there must be some articulated reasoning with some rational underpinning to support the legal conclusion obviousness") (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The Moureaux patent thus fails to anticipate the present claims. Accordingly, Appellants respectfully ask this Honorable Board to REVERSE the rejection.

B. Claims 2 and 6

Claims 2 and 6, which are directed toward embodiments of the invention that include 30 weight percent or less thermoplastic polyurethane in the first layer, are separately patentable over the Moureaux reference because the Moureaux reference teaches that the thermoplastic polyurethane in the graft-polymer layer should be between 50 and 95 weight percent and that the ethylene vinyl alcohol is embedded into the body of the thermoplastic urethane.

Claim 2 includes a limitation of 30 weight percent or less of polyurethane in the first layer. In contrast, the Moureaux reference teaches that its graft polymer layer has between 50 and 95 weight percent polyurethane. Col. 2, lines 36-39. Further, the Moureaux reference teaches, and requires, that the ethylene vinyl alcohol copolymer of the graft polymer layer is embedded into the body of the thermoplastic polyurethane. Fig. 1; col. 5, line 62 to col. 6, line 9 & 28-31; col. 8, lines 19-22; claim 12. Thus, again, the ethylene vinyl alcohol copolymer is a minor portion and the thermoplastic polyurethane is a major portion of the graft copolymer layer.

Claim 6 is dependent on claim 2 and includes a limitation of about 5 to about 25 wt. % aliphatic thermoplastic polyurethane, and so is patentable over Moureaux for the same reasons as is claim 2.

Because the Moureaux reference teaches that the polyurethane is more than 50 weight percent of the graft copolymer layer, Appellants submit that claims 2 and 6, in which the polyurethane is respectively 30 and 25 weight percent or less of the first layer, are neither anticipated by or obvious in view of the Moureaux reference.

Thus, for this additional reason, Appellants believe this Honorable Board should REVERSE the rejection of claims 2 and 6.

C. Claim 9

Claim 9, which is directed toward gas-filled cushioning devices in which the first layer includes between 50 and 97 weight percent of ethylene-vinyl alcohol copolymer, is separately patentable over the Moureaux reference because the Moureaux reference teaches that the amount of ethylene-vinyl alcohol copolymer in its graft-polymer layer is 5 to 20 weight percent and that the ethylene vinyl alcohol is embedded into the body of the thermoplastic polyurethane of that layer.

Claim 9 recites between 50 and 97 weight percent of ethylene-vinyl alcohol copolymer in the first layer. In contrast, the Moureaux reference teaches that its graft polymer layer has 5 to 20 weight percent ethylene-vinyl alcohol copolymer. Col. 2, lines 25-29; col. 3, lines 51-53; claim 3. Further, the Moureaux reference teaches, and requires, that the ethylene vinyl alcohol copolymer of the graft polymer layer is embedded into the body of the thermoplastic urethane. Fig. 1; col. 5, line 62 to col. 6, line 9 & 28-31; col. 8, lines 19-22; claim 12. Thus, again, the ethylene vinyl alcohol copolymer is a minor portion and the thermoplastic polyurethane is a major portion of the graft copolymer layer.

Because the Moureaux reference teaches that the ethylene-vinyl alcohol copolymer is 5 to 20 weight percent of the graft copolymer layer, Applicants submit that claim 9, in which the ethylene-vinyl alcohol copolymer is 50 to 97 weight percent of the first layer, is separately patentable over the Moureaux reference.

For this additional reason, then, Appellants respectfully ask this Honorable Board to REVERSE the rejection of claim 9 over the Moureaux reference.

III. Claim 4 is patentable over Moureaux, U.S. Patent 5,036,110 because underlying independent claim 1 is patentable over Moureaux, U.S. Patent 5,036,110.

Claim 4, which depends on claim 1, is patentable over the Moureaux patent for the same reasons, discussed in the preceding section, that claim 1 is patentable over the Moureaux patent. In summary, the Moureaux reference fails to disclose or suggest hydrogen bonding between layers of a membrane, or to suggest a configuration in which such hydrogen bonding is possible between layers. Instead, the Moureaux reference teaches away from such a configuration by requiring covalent bonding of islets of ethylene-vinyl alcohol copolymer within a polyurethane layer, so that the grafted copolymer cannot hydrogen bond with adjacent layers. Accordingly, Appellants respectfully ask this Honorable Board to REVERSE the rejection of claim 4.

IV. Claim 7 is patentable over Moureaux, U.S. Patent 5,036,110 in combination with Matsumoto, U.S. Patent 4,410,595 because the Matsumoto patent also does not suggest the hydrogen bonding between layers that is absent from the Moureaux patent.

Claim 7 is also dependent on claim 1 and, therefore, is patentable over the Moureaux patent for the same reasons discussed in the preceding sections. The Matsumoto patent does not overcome the deficiency of the Moureaux patent, as the Matsumoto patent also does not teach hydrogen bonding between a first layer having copolymer of ethylene and vinyl alcohol and 50% or less of aliphatic thermoplastic polyurethane and a second layer of an elastomeric thermoplastic material. Accordingly, Appellants respectfully ask this Honorable Board to REVERSE the rejection of claim 7.

- V. Claim 8 is patentable over Moureaux, U.S. Patent 5,036,110 in combination with Smith, U.S. Patent 5,450,235 because the Smith patent also does not suggest the hydrogen bonding between layers that is absent from the Moureaux patent.**

Likewise, claim 8, which is dependent on claim 1, is patentable over the Moureaux patent for the same reasons discussed in the preceding sections. The Smith patent does not overcome the deficiency of the Moureaux patent, as the Smith patent also does not teach hydrogen bonding between a first layer having copolymer of ethylene and vinyl alcohol and 50% or less of aliphatic thermoplastic polyurethane and a second layer of an elastomeric thermoplastic material. Accordingly, Appellants respectfully ask this Honorable Board to REVERSE the rejection of claim 8.

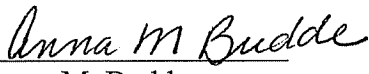
- VI. The rejection of Claim 1 for obviousness-type double patenting over parent patent U.S. Patent No. 6,599,597 in view of Moureaux, U.S. Patent 5,036,110 should be set aside as moot.**

Appellants filed a terminal disclaimer over U.S. Patent No. 6,599,597 on February 23, 2006. The Examiner has not, however, withdrawn this rejection. Accordingly, Appellants respectfully ask this Honorable Board to set aside this rejection as accommodated by the terminal disclaimer.

Conclusion

The present claims are patentable over the cited art. Applicants, therefore, respectfully petition this Honorable Board to reverse the final rejection of the claims on each ground and to indicate that all claims are allowable.

Respectfully submitted,


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Claim Appendix

Copy of the Claims Appealed

1. A gas-filled cushioning device, comprising:

a multi-layer film formed into a gas-filled membrane having an interior compartment containing at least one capture gas constituent,

said multi-layer film including a first layer comprising a combination of at least one aliphatic thermoplastic polyurethane and at least one copolymer of ethylene and vinyl alcohol, wherein the first layer includes up to about 50 wt. % of aliphatic thermoplastic polyurethane, and a second, outer layer comprising a flexible resilient elastomeric thermoplastic material,

said multi-layer film being capable of selectively resisting an outward diffusion of said capture gas constituent and permitting an inward diffusion pumping of at least one mobile gas constituent,

wherein hydrogen bonding occurs along a segment of the film between the first layer and the second layer.
2. The gas-filled cushioning device according to Claim 1, wherein said first layer includes between about 1 wt. % to about 30 wt. % of aliphatic thermoplastic polyurethane.
3. The gas-filled cushioning device according to Claim 1, wherein the thermoplastic material of said second layer comprises a thermoplastic polyurethane selected from the group consisting of polyester, polyether, polycaprolactone, polyoxypropylene and polycarbonate macroglycol based materials and mixtures thereof.

4. The gas-filled cushioning device according to Claim 1, wherein the first layer including a combination of at least one aliphatic thermoplastic polyurethane and at least one copolymer of ethylene and vinyl alcohol has an average thickness of about 0.5 mils to about 10 mils and said second layer of thermoplastic material has an average thickness of about 5 mils to about 100 mils.
5. The gas-filled cushioning device according to Claim 1, wherein said capture gas constituent is nitrogen.
6. The gas-filled cushioning device according to Claim 2, wherein said first layer includes about 5 wt. % to about 25 wt. % of aliphatic thermoplastic polyurethane.
7. The gas-filled cushioning device according to Claim 1, wherein said copolymer of ethylene and vinyl alcohol is selected from the group consisting of copolymers including an ethylene content of about 25 mol. % to about 48 mol. %.
8. The gas filled cushioning device according to Claim 1, wherein said first layer also includes an aromatic thermoplastic polyurethane.
9. The gas-filled cushioning device according to Claim 1, wherein said first layer includes:
 - (a) 50 wt. % to about 97 wt. % of at least one copolymer of ethylene and vinyl alcohol;

(b) 3 wt. % to about 50 wt. % of at least one aliphatic thermoplastic polyurethane;
and

(c) up to about 3 wt. % of one or more aromatic thermoplastic polyurethanes;
wherein the total constituency of said first layer is equal to 100 wt. %.

10. The gas-filled cushioning device according to Claim 1, further comprising a third layer including a thermoplastic polyurethane selected from the group consisting of polyester, polyether, polycaprolactone, polyoxypropylene and polycarbonate macroglycol based materials and mixtures thereof; said third layer and said second layer being disposed so as to sandwich the first layer.

EVIDENCE APPENDIX

Evidence entered by examiner and relied on by appellant

None.

RELATED PROCEEDINGS APPENDIX

7022-00000-31007
Request Reconsider N^e

✓ AMB

Due 3/16/03

Appeal Fed

Cir Rep Due 3/16/03

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board. -

Paper No. 14

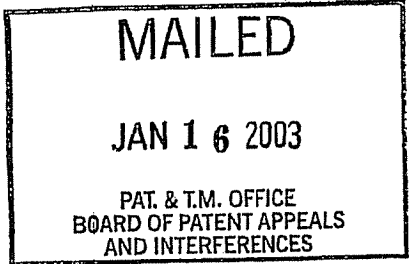
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HENRY W. BONK and DAVID GOLDWASSER

Appeal No. 2001-0168
Application No. 09/170,790

ON BRIEF



Before WILLIAM SMITH, WARREN, and POTEATE, Administrative Patent Judges.

POTEATE, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1-43 and 64-66. Claims 44-63 are pending but have been withdrawn from consideration as directed to a non-elected invention. See Final Rejection, Paper No. 5, mailed July 26, 1999, page 2.

Claims 1, 2 and 10 are representative of the subject matter on appeal and are reproduced below:

1. A barrier membrane having improved resistance to undesired gas permeation, comprising:

a first layer including a combination of at least one aliphatic thermoplastic urethane and a copolymer of ethylene and vinyl alcohol; and

a second layer including a thermoplastic urethane;

wherein hydrogen bonding occurs along a segment of the membrane between the first and second layers, and further wherein said barrier membrane is sealed and is inflated with a gas toward which said membrane has a gas transmission rate value of about $10.0 \text{ cc/m}^2 \times \text{atm} \times \text{day}$ or less.

2. The barrier membrane according to Claim 1, wherein said first layer includes up to about 50 wt.% of aliphatic thermoplastic urethane.

10. The barrier membrane according to Claim 1, wherein said first layer includes:

(a) 50 wt.% to about 97 wt% of at least one ethylene and vinyl alcohol copolymer;

(b) 3 wt.% to about 50 wt.% of at least one aliphatic thermoplastic urethane; and

(c) up to about 3.0 wt.% of one or more aromatic urethanes;

wherein the total constituency of said first layer is equal to 100.0 wt.%.

The reference relied upon by the examiner is:

Moureaux

5,036,110

Jul. 30, 1991

Ground of Rejection¹

Claims 1-43 and 64-66 stand rejected under 35 U.S.C. § 103 as unpatentable over Moureaux.

We affirm as to claims 1, 5-9, 17-21, 23, 27-30, 32, 36-40, 42-43 and 64-66. We reverse as to claims 2-4, 10, 14-16, 22, 24-26, 31, 33-35 and 41.

Background

The invention is directed to a barrier membrane having improved resistance to undesired gas permeation and to a method of producing a laminated barrier membrane useful for controlling gas permeation therethrough. Such barrier membranes are, for example, useful in vehicle tires and sporting goods, accumulators used on heavy machinery and cushioning devices used in footwear. Specification, page 2, lines 1-6.

The barrier membrane of the invention includes first and second layers. The first layer is a combination of at least one aliphatic thermoplastic urethane and a copolymer of ethylene and

¹ The rejections of claims 1-43 and 64-66 under 35 U.S.C. § 112 first and second paragraphs have been withdrawn in view of the amendment after final rejection, Paper No. 9, received March 2, 2000. See Examiner's Answer, Paper No. 12, page 2, paragraph (6).

vinyl alcohol. The second layer includes a thermoplastic urethane. The first and second layers are held together by hydrogen bonding. In accordance with the method of the invention, the laminated barrier membrane is preferably manufactured by extruding the layers.

Discussion

Appellants assert that "[e]ach of the present claims is patentable over the Moureaux reference because the Moureaux reference fails to teach, mention or suggest hydrogen bonding between layers of a barrier membrane." Appeal Brief, Paper No. 10, received March 2, 2000, page 9. Appellants appear to concede that Moureaux teaches a barrier membrane having layers containing the same chemical components as the claimed first and second layers. See id., pages 9 and 10. However, appellants maintain that the structure of Moureaux's first layer is such that hydrogen bonding would not occur, while the structure of appellants' first layer allows for hydrogen bonding to occur along a segment of the membrane between the first and second

layers.² Appeal Brief, page 10. In particular, appellants' first layer is such that the ethylene vinyl alcohol copolymer is present at the layer surface. Id. In contrast, Moureaux teaches that the ethylene-vinyl alcohol copolymer, as part of the graft polymer, is embedded as eyelets in the polyurethane. See id. (referencing Figure 1 of Moureaux). Appellants argue that the embedded copolymer is not in contact with adjacent membrane layers and, therefore, hydrogen bonding cannot occur at the interface of the layers. See id.

In deciding patentability issues under 35 U.S.C. § 103 "[a]nalysis begins with the key legal question -- what is the invention claimed?" Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1567-68, 1 USPQ2d 1593, 1597 (Fed. Cir.), cert. denied, 481 U.S. 1052 (1987). In determining the patentability of claims, the Patent Office gives claim language its "broadest reasonable interpretation" consistent with the specification and claims. In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997).

² The examiner acknowledges that "[t]he claimed gas transmission rate is not disclosed" in Moureaux, but found that the membrane "would inherently display a gas transmission rate within the claimed maximum period." Examiner's Answer, page 3. Appellants have not traversed the examiner's finding.

As pointed out by the examiner, "[t]he claims merely define a layer of a combination of a polyurethane and ethylene-vinyl alcohol copolymer without specifying the position of the copolymer within the layer." Examiner's Answer, page 7. Moreover, the claims do not specifically recite that the hydrogen bonding occurs "between a copolymer of ethylene-vinyl alcohol (EVOH) of the first layer and a thermoplastic polyurethane (TPU) of a second layer." See Appeal Brief, page 9. Rather, the claims merely require that hydrogen bonding occur along a segment of the membrane between the first and second layers.³

Although the initial burden of establishing a prima facie case of obviousness rests on the examiner, see In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992), the PTO can require an applicant to prove that a prior art product does not necessarily or inherently possess the characteristics of the claimed product where the claimed and prior art products are

³ According to appellants' specification, "it is believed that significant bonding occurs as the result of available hydrogen molecules being donated by the vinyl alcohol groups of the ethylene-vinyl alcohol co-polymer along the length of the laminated membrane and hydroxyl and urethane carbonyl groups, or simply the available polar groups of aliphatic thermoplastic urethane." Specification, page 32, lines 6-10 (emphasis added).

identical or substantially identical, or are produced by identical or substantially identical processes. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

In arguing that Moureaux's structure could not exhibit hydrogen bonding, appellants rely, in particular, on the embodiment shown in Figure 1 of Moureaux wherein the ethylene-vinyl alcohol copolymer is *not depicted* as being present at the surface of the membrane layer. See supra, page 5. The examiner concludes that "[t]he ethylene-vinyl alcohol is not limited to a location within the polyurethane but is uniformly distributed throughout the membrane, including the surface" (Examiner's Answer, page 6).

We find that Moureaux discloses at least one film of a graft polymer, formed by the reaction of thermoplastic polyurethane with a copolymer of ethylene and vinyl alcohol (as described in connection with **FIG. 1**, see Moureaux, column 6, lines 11-12), which is arranged between two layers 3 of a thermoplastic polyurethane. See id., lines 10-16. The layer containing the co-polymer may be made by *mixing* the thermoplastic polyurethane and the co-polymer. See id., claim 2. Specifically, Moureaux teaches that these materials may be mixed for a few minutes at a temperature between 150 °C and 250 °C

(302 °F - 482 °F). Id., column 7, lines 10-13. The membrane is then formed by incorporating the film between the layers of thermoplastic polyurethane in a bi-material injection press. Moureaux, column 7, lines 13-16.

Moureaux is silent as to how bonding is effected between the layers in the aforementioned embodiment. However, since Moureaux utilizes the same starting materials and temperatures as appellants (300 °F to about 450 °F, Specification, page 39, lines 17-19) (see Final Rejection, Paper No. 8, mailed December 6, 1999, page 4), it would be expected that Moureaux's process would produce a structure which falls within the limitations of claim 1. Thus, we agree with the examiner's conclusion that the gas-barrier membrane of Moureaux inherently exhibits hydrogen bonding between the layers. See Examiner's Answer, page 3. See Lamberti, 545 F.2d 747 at 750, 192 USPQ at 280 ("[T]he question under 35 U.S.C. § 103 is not merely what the references expressly teach, but what they would have suggested to one of ordinary skill in the art at the time the invention was made.")

Appellants separately argue the patentability of dependent claims 2-4, 10, 14-16, 22, 24-26, 31, 33-35 and 41 which define barrier membranes having 50 weight percent or less thermoplastic

urethane in the first layer. Appeal Brief, page 3. Appellants also separately argue the patentability of claims 10, 22, 31 and 41 which are directed to barrier membranes that include 50-97 weight percent of ethylene-vinyl alcohol copolymer and 3-15 weight percent of thermoplastic urethane in the first layer.⁴

Appellants assert that all of these claims define over Moureaux which "teaches that the polyurethane is at least 80 weight percent of the graft copolymer layer." Appeal Brief, page 11. According to appellants, the examiner has misinterpreted Moureaux as disclosing two distinct layers one of which contains a minority of ethylene-vinyl alcohol copolymer and another of which contains a majority, i.e., 50-95% of ethylene-vinyl alcohol copolymer. See Reply Brief, Paper No. 12, received May 23, 2000, page 1. We agree.

Claims 2-4, 14-16, 24-26, and 33-35 require that the barrier membranes include 50 weight percent or less thermoplastic urethane in the first layer. Each of claims 10, 22, 31 and 41 specify that the first layer of the claimed membrane includes "50 wt.% to about 97 wt% of at least one ethylene and vinyl alcohol"

⁴ We note that the presence of "3.0 wt.% of one or more aromatic urethanes" as recited in these claims is merely optional since it is preceded by the language "up to."

and "3 wt.% to about 50 wt." of at least one aliphatic thermoplastic urethane." Moureaux discloses a membrane comprising a film 2 of a graft polymer formed by the reaction of thermoplastic polyurethane with ethylene-vinyl alcohol copolymer arranged between two layers 3 of thermoplastic polyurethane membrane. See, supra, pages 7-8. Film 2 may be obtained by mixing these components "in a proportion of 50% to 95% of EVOH with respect to the thermoplastic polyurethane" to form a graft polymer. Moureaux, column 6, lines 24-25 (emphasis added). In the resulting film 2, the amount of ethylene-vinyl alcohol copolymer with respect to the first material is in the range of 5-20%. Id. column 2, lines 25-39 (emphasis added). Thus, Moureaux does not render obvious those claims which require that the barrier membrane include 50 weight percent or less thermoplastic urethane or those claims which require that the first layer include 5 wt.% of at least one ethylene and vinyl alcohol.

In sum, we conclude that the examiner has established a prima facie case of obviousness with respect to claims 1, 5-9, 17-21, 23, 27-30, 32, 36-40, 42-43 and 64-66 which appellants have failed to rebut. The rejection is affirmed as to these claims. The examiner has failed to establish a prima facie case

of obviousness with respect to claims 2-4, 10, 14-16, 22, 24-26, 31, 33-35 and 41. We reverse the rejection as to these claims.

Other Issues

1. 37 CFR § 1.192(c)(7) (July, 1999) provides that for each ground of rejection which appellant contest and which applies to a group of two or more claims, the Board shall select a single claim from the group and shall decide the appeal as to the ground of rejection on the basis of that claim alone unless a statement is included that the claims of the group do not stand or fall together and, in the argument under ¶ (c)(8) of this section, appellant explains why the claims of the group are believed to be separately patentable.

Precisely how appellants view the patentability of the claims over Moureaux is unclear from the stated grouping of the claims. Claim 2 is grouped with claim 1. However, claim 2 is also grouped separately from claim 1. Similarly, claims 10, 22, 31 and 41 are indicated as standing or falling with claim 2 and, yet, are separately grouped. Since appellants appear to have made a bonafide attempt to separately argue the patentability of three groups of claims, we have separately considered the patentability of each of claims 1, 2 and 10.

2. In the event that appellants elect to continue prosecution of this application, claims 31 and 41 should be amended to correct the preamble. In particular, the preambles

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